

```
In [1]: import math116
import numpy as np
```

```
In [2]: p=937
```

```
In [3]: n=p-1
```

```
In [4]: math116.factor(n)
```

```
Out[4]: Counter({2: 3, 3: 2, 13: 1})
```

```
In [5]: y=46
```

```
In [8]: pow(y,n//2,p)
```

```
Out[8]: 936
```

```
In [39]: y_1=(y*pow(5,-1,p))%p
```

```
In [12]: y_1
```

```
Out[12]: 384
```

```
In [14]: pow(y_1,n//8,p)
```

```
Out[14]: 936
```

```
In [45]: h=pow(5,n//13,p)
h
```

```
Out[45]: 911
```

```
In [46]: [pow(h,i,p) for i in range(13)]
```

```
Out[46]: [1, 911, 676, 227, 657, 721, 931, 156, 629, 512, 743, 359, 36]
```

```
In [40]: pow(y_1,n//9,p)
```

```
Out[40]: 322
```

```
In [47]: pow(y,n//13,p)
```

```
Out[47]: 156
```

```
In [49]: math116.crt_general([5,7,7],[8,9,13])
```

```
Out[49]: (709, 936)
```

```
In [50]: pow(5,709,p)
```

```
Out[50]: 46
```

```
In [99]: y=14652320651439828423046368044446485954319801736
```

```
In [91]: p=1047073721667575963973626541914699579101292247109
```

```
In [54]: n=p-1
```

```
In [92]: h=pow(13,n//3,p)
h
```

```
Out [92]: 1039811625092996309995927348674998798108568888626
```

```
In [93]: [pow(h,i,p) for i in range(3)]
```

```
Out [93]: [1,
1039811625092996309995927348674998798108568888626,
7262096574579653977699193239700780992723358482]
```

```
In [89]: pow(y,n//3,p)
```

```
Out [89]: 7262096574579653977699193239700780992723358482
```

```
In [94]: y_1=(y*pow(13,-2,p))%p
y_1
```

```
Out [94]: 365633147331588294099804806751548648833908653143
```

```
In [95]: pow(y_1,n//9,p)
```

```
Out [95]: 1039811625092996309995927348674998798108568888626
```

```
In [96]: y_2=(y*pow(13,-5,p))%p
```

```
In [97]: pow(y_2,n//27,p)
```

```
Out [97]: 1039811625092996309995927348674998798108568888626
```

```
In [87]: math116.crt_general([2,14,7],[4,27,11])
```

```
Out [87]: (986, 1188)
```

```
In [98]: q=88137518658868656543456685113383484091996841
```

```
In [101... pow(y,n//2,p)
```

```
Out [101... 1
```

```
In [102... pow(13,n//2,p)
```

```
Out [102... 1047073721667575963973626541914699579101292247108
```

```
In [ ]:
```